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CLAIMS:

1. A valve pin for use in a melt channel in an injection molding machine, comprising:
 - a valve pin body; and
 - 5 at least one thermocouple positioned substantially completely inside said valve pin body, wherein said valve pin body is free of any heaters so that said at least one thermocouple is adapted for measuring the temperature of melt in said melt channel.
- 10 2. A valve pin as claimed in claim 1, wherein said at least one thermocouple includes a sensing portion and a pair of electrical conduits for connecting said sensing portion to a receiving device.
3. A valve pin as claimed in claim 2, wherein said valve pin body has an
15 end that is adapted to be positioned proximate a gate into a mold cavity, and said sensing portion of said at least one thermocouple is positioned in said end.
4. A valve pin as claimed in claim 2, wherein said sensing portion of said
20 at least one thermocouple is adapted to be exposed to melt when said valve pin body is positioned in said melt channel.
5. A valve pin as claimed in claim 4, wherein said sensing portion of said
25 at least one thermocouple is flush with said end.
6. A valve pin as claimed in claim 2, wherein said valve pin includes a first
said thermocouple and a second said thermocouple, and said sensing portion
of said first thermocouple is spaced from said sensing portion of said second
thermocouple.
- 30 7. A valve pin as claimed in claim 6, wherein said valve pin body has an
end that is adapted to be positioned proximate a gate into a mold cavity, and

said sensing portion of said first thermocouple is positioned proximate said end.

8. A valve pin system comprising the valve pin as claimed in claim 1 and
5 an actuator for moving said valve pin in said melt channel.

9. An injection nozzle for an injection molding machine, comprising:
a nozzle body means for transferring melt downstream to a gate into a
mold cavity, the nozzle body means defining a nozzle melt channel;
10 a heater, wherein said heater is thermally connected to the nozzle melt
channel defining means, wherein the heater is configured to heat melt in said
nozzle melt channel;
a means for measuring the temperature of melt in the nozzle melt
channel; and
15 a means for measuring the temperature of one of the nozzle body
means and the heater.

10. An injection nozzle as claimed in claim 9, wherein the means for
measuring the temperature of melt in the melt channel has a sensing portion
20 that is exposed to melt in the nozzle melt channel.

11. An injection nozzle as claimed in claim 9, wherein the means for
measuring the temperature of one of the nozzle body means and the heater
includes a thermocouple positioned in the nozzle body.
25

12. An injection nozzle as claimed in claim 9, further comprising a valve pin
positioned at least partially in said nozzle melt channel, said valve pin
including a valve pin body and at least one valve pin thermocouple positioned
at least partially within said valve pin body.
30

13. An injection nozzle as claimed in claim 12, wherein said valve pin is
movable in said nozzle between a first position wherein said downstream end
closes said gate, and a second position wherein said end is spaced from said
gate to permit melt flow through said gate.

14. A valve pin for use in a melt channel in an injection molding machine, comprising:
- 5 a valve pin body; and
- at least one means for measuring temperature of melt in said melt channel, wherein said at least one means is positioned substantially completely inside said valve pin body.
15. A valve pin as claimed in claim 14, wherein said valve pin body is free of any heaters.
- 10
16. A valve pin as claimed in claim 14, wherein said valve pin body has an end that is adapted to be positioned proximate a gate into a mold cavity, and said sensing portion of said at least one thermocouple is positioned in said
- 15 end.
17. A valve pin as claimed in claim 16, wherein said sensing portion is flush with said end.
- 20
18. A valve pin as claimed in claim 14, wherein said at least one means has a sensing portion that is adapted to be exposed to melt when said valve pin body is positioned in said melt channel.
19. A valve pin as claimed in claim 14, wherein said valve pin body
- 25 includes a first said means having a first sensing portion and a second said means having a second sensing portion, wherein said first and second sensing portions are spaced from each other for measuring melt at different positions in the melt channel.
- 30
20. An injection nozzle for an injection molding machine, comprising:
- a nozzle body defining a nozzle melt channel therein for transferring melt downstream to a gate into a mold cavity;

a heater, wherein said heater is thermally connected to the nozzle body, wherein the heater is configured to heat melt in said nozzle melt channel;

5 a first thermocouple for measuring the temperature of melt in the melt channel; and

a second thermocouple having a sensing portion that is positioned proximate said heater for measuring the temperature of the heater.

21. An injection nozzle as claimed in claim 20, further comprising a valve pin positioned at least partially in said nozzle melt channel, said valve pin including a valve pin body and at least one valve pin thermocouple positioned at least partially within said valve pin body.

22. An injection nozzle as claimed in claim 21, wherein said first thermocouple includes a first sensing portion, and said valve pin body has a downstream end, and said sensing portion of said at least one thermocouple is positioned in said downstream end.

23. An injection nozzle as claimed in claim 21, wherein said valve pin is movable in said nozzle between a first position wherein said downstream end closes said gate, and a second position wherein said end is spaced from said gate to permit melt flow through said gate.

24. An injection nozzle for an injection molding machine, comprising:
25 a nozzle body defining a nozzle melt channel therein for transferring melt downstream to a gate into a mold cavity;

a heater, wherein said heater is thermally connected to the nozzle body, wherein the heater is configured to heat melt in said nozzle melt channel;

30 a valve pin positioned at least partially within the nozzle melt channel, wherein the valve pin is movable between a first position wherein the valve pin closes the gate to prevent melt flow through the gate, and a second position wherein the valve pin is spaced from the gate;

a first thermocouple that is movable with the valve pin; and

a second thermocouple that is stationary and is connected at least indirectly to the nozzle body.

25. An injection nozzle as claimed in claim 24, wherein said first
5 thermocouple includes a first sensing portion, and said valve pin body has a downstream end, and said sensing portion of said at least one thermocouple is positioned in said downstream end.

26. An injection nozzle as claimed in claim 24, wherein said valve pin is
10 movable in said nozzle between a first position wherein said downstream end closes said gate, and a second position wherein said end is spaced from said gate to permit melt flow through said gate.

27. An injection nozzle for an injection molding machine, comprising:
15 a nozzle body defining a plurality of nozzle melt channels therein, wherein said plurality of nozzle melt channels are adapted to transfer melt from a plurality of melt sources to a gate into a mold cavity;
a thermocouple positioned for measuring the temperature of melt in at least one nozzle melt channel; and
20 a heater, wherein said heater is adapted to heat melt in said plurality of nozzle melt channels.

28. An injection nozzle as claimed in claim 27, further comprising a valve pin positioned at least partially in at least one of the plurality of nozzle melt
25 channels, said valve pin including a valve pin body and wherein the thermocouple is positioned at least partially within said valve pin body, wherein said valve pin is movable to control the flow of melt into the mold cavity.

30 29. An injection nozzle as claimed in claim 27, further comprising a heater thermocouple, wherein said heater thermocouple has a sensing portion that is positioned adjacent said heater.

30. An injection nozzle for an injection molding machine, comprising:

a nozzle body defining a plurality of nozzle melt channels therein, wherein said plurality of nozzle melt channels are adapted to transfer melt from a plurality of melt sources to a gate into a mold cavity;

5 a valve pin positioned at least partially in at least one nozzle melt channels, said valve pin including a valve pin body and at least one valve pin thermocouple positioned at least partially within said valve pin body;

an actuator for moving said valve pin in said at least one nozzle melt channel; and

10 a heater, wherein said heater is adapted to heat melt in said plurality of nozzle melt channels, wherein said heater is electrically linked to said at least one valve pin thermocouple and wherein said heater is positioned outside said valve pin.

31. An injection nozzle as claimed in claim 30, further comprising a heater thermocouple, wherein said heater thermocouple has a sensing portion that is positioned adjacent said heater, wherein said heater thermocouple is electrically linked to said heater.

32. An injection molding machine, comprising:
20 a manifold block, said manifold block defining a plurality of manifold melt channels therethrough, wherein said plurality of manifold melt channels are configured to be downstream from a melt source;

a plurality of nozzles for transferring melt from said plurality of manifold melt channels to a plurality of gates into a plurality of mold cavities, wherein
25 each nozzle includes a nozzle body defining a nozzle melt channel therein, wherein each nozzle includes a valve pin positioned at least partially in said nozzle melt channel, wherein the valve pin is movable to control the flow of melt through the nozzle melt channel, and wherein said valve pin includes a valve pin body and at least one valve pin thermocouple positioned at least
30 partially within said valve pin body, wherein each nozzle includes a heater for heating melt in said nozzle melt channel, wherein said heater is positioned outside said valve pin.

33. An injection molding machine as claimed in claim 32, further comprising a mold cavity block, wherein said mold cavity block defines a plurality of mold cavities, wherein the mold cavity block is positioned so that each mold cavity is downstream from one of said nozzles.

5

34. An injection molding machine as claimed in claim 32, wherein each nozzle further includes a heater thermocouple, wherein said heater thermocouple has a sensing portion that is positioned adjacent said heater.

10 35. An injection molding machine as claimed in claim 32, wherein each nozzle further includes an actuator, wherein said actuator includes a chamber and a piston that is movable within said chamber, wherein said valve pin is connected to said piston, said piston has two faces, and said piston is adapted to be moved in said chamber by differential pressure of an actuating
15 fluid in said chamber on said two faces of said piston.

36. An injection molding machine as claimed in claim 35, wherein said valve pin is removably connected to said actuator.

20 37. An injection molding machine, comprising:
a manifold block, said manifold block defining a plurality of manifold melt channels therethrough for conveying melt from a melt source towards a plurality of injection nozzles; and
at least one means for measuring the temperature of at least a portion
25 of the melt in at least one manifold melt channel.

38. An injection molding machine, comprising:
a manifold block, said manifold block defining a plurality of manifold melt channels therethrough for conveying melt from a melt source to a plurality of injection nozzles; and
30 a plurality of injection nozzles for transferring melt from said plurality of manifold melt channels towards a plurality of gates into a plurality of mold cavities, wherein each injection nozzle includes a nozzle body defining a nozzle melt channel therein, and wherein each injection nozzle further

includes a valve pin having a thermocouple positioned therein, wherein said thermocouple has a sensing portion, wherein said valve pin is movable in said nozzle melt channel for controlling the flow of melt through said nozzle melt channel, and wherein said valve pin is movable to a position wherein said

5 sensing portion is in said at least one manifold melt channel.